7. Surface Water Investigations

(1) General Description

DEQ's Surface Water Investigations (SWI) group is part of the Office of Wetlands & Stream Protection (OWSP), and is collocated with the Virginia Department of Forestry on the University of Virginia campus in Charlottesville, Virginia. SWI works cooperatively with the U.S. Geological Survey (USGS) to operate and maintain a statewide network of 67 surface water-gauging stations and approximately 170 ground water monitoring wells and to produce annual Water Resources Data Reports (see §(2) - "Data Management and Reporting," below). This cooperative agreement has been in effect since 1925, except for a brief period from 1957 to 1967 when the agencies operated independently.

The SWI staff is currently composed of five full time employees. SWI activities are supervised by a team leader located at DEQ's Charlottesville Office, and overall program oversight is managed by the Director of OWSP. The SWI is divided into two functional groups: (1) Surface Water Gauging and (2) Miscellaneous Measurements/Special Studies/Ground Water Level Monitoring. The latter group has one technician that is located at DEQ's Tidewater Regional Office because of its proximity to the monitoring wells located in Coastal Plain aquifers.

(2) Data Management and Reporting

The "Surface Water Gauging Group" is responsible for operating and maintaining DEQ's portion of the surface water-gauging network. They visit each of DEQ's gauges every six to eight weeks and conduct routine maintenance while making a flow measurement and retrieving data collected by the recording instruments. More extensive maintenance activities are conducted during the summer months. All measurements and computations of stream flow are carried out using standard operating procedures described in U.S. Geological Service Water-Supply Paper 2175 [http://water.usgs.gov/pubs/wsp/wsp2175/] (USGS, 1982, Vol. 1 and 2). At the end of each water year, which extends from October 1 to September 30, the group prepares the collected data for publication in the annual USGS Water Resources Data Report [http://streamstatsags.cr.usgs.gov/ThreatenedGages/gmaps/va_gm_base.htm].

The "Miscellaneous Measurement et al. Group" is responsible for conducting site specific in-stream measurements above select VPDES permitted outfalls or TMDL sites, performing dye studies to determine time of travel or effluent mixing zones, and operating and maintaining the DEQ portion of the ground water well network. The ground water level data is collected quarterly and is published by the USGS as Volume 2 of the Water Resources Data Report [http://waterdata.usgs.gov/va/nwis/].

The data collected at continuous record surface water gauging sites and the measurement data collected above VPDES outfalls are used to develop flow frequencies required during the issue and renewal of VPDES permits. The Regional Office Permit Writers who are responsible for conducting the flow frequency analysis, preparing flow frequency memos and maintaining the Flow Frequency Tracking database, carry out the flow frequency development process. This database receives pertinent information about the permittee, the receiving stream, and the gauges used to develop the flow frequencies. The database is crucial to flow frequency development because it provides historical information about past analyses performed on the same stream, consequently reducing redundancy and ensuring consistency.

(3) General Support and Infrastructure

Their current annual operations budget is approximately $250,000, which includes payments to the USGS for contracted services (e.g., real-time network costs). An inventory of 72 flow gauges currently in service, at a unit replacement cost of $10,000 and average life span of seven years, requires an average of approximately $96,000 annually, just to maintain the existing system.

(4) Plan and Schedule for Implementation

Water quantity monitoring is an integral part of the DEQ strategy to investigate water quality conditions of the state's aquatic resources. Water quantity studies have been used by the DEQ for decades. Although the possibility exists for establishing additional gauging stations in the future, this is considered a fully implemented module of the WQM Strategy. Several improvements, as briefly summarized below, have been accomplished in the recent past.

During 2005/2006 72 gauging stations and 34 ground water wells were converted to real time sites, with transmission of data to the USGS Current Water Data for Virginia web site via GOES satellite. [http://waterdata.usgs.gov/va/nwis/rt]

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